

SYSTEM AND METHOD FOR COOLING THE CORTEX

TO TREAT NEOCORTICAL SEIZURES

Abstract of the Disclosure

A manually activated Peltier device was placed in direct contact with a cortical slice. Seizures terminated within seconds of the onset of cooling, sometimes preceding a detectable drop in temperature measured near the top of the slice. Activation of the Peltier did not stop seizures when slices were no longer in direct physical contact with the device, indicating that this was not a field effect. When cooling was shut off and temperature returned to 33⁰ C, the bursting sometimes returned, but a longer term suppressive effect on seizure activity could be observed. In two experiments, a custom computer program automatically detected seizure discharges and triggered a TTL pulse to activate the Peltier. In these experiments the Peltier automatically terminated the slice bursting in less than four seconds. When the Peltier device was placed in contact with the normal, exposed cortex of a newborn pig, we found that the cortical temperature rapidly decreased from 36⁰ C to as low as 26⁰ C, at a depth of 1.7 mm below the cooling unit. Therefore, local cooling may *rapidly* terminate focal paroxysmal discharges and might be adapted for clinical practice.